

**FINAL REPORT**

**COMBAT READINESS**

**OF**

**DETACHMENT "C"**

**PROJECT "Aquatone"**

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105

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ANNEX I

## TAB A

Narrative of Formal Training

## SECTION I - Operations &amp; Training

25X1 1. Training of Detachment "C" began on 6 August 1956 with the arrival of four (4) pilots. Four more pilots reported on 20 August and the last three on 10 September. [ ] the Detachment Commander reported on 20 August. Operations staff officers arrived between this date and 5 October. All pilots were TDY for approximately 10 days during the training period to receive survival training. The arrival of pilots in groups of three or four on pre-planned dates simplified the training staff's problems considerably.

2. Two of the eleven pilots were lost during training; one was killed in a U-2 crash on 31 August, and the other resigned on 26 September.

3. The most serious problem encountered in the training of this unit was a shortage of aircraft caused by loss of two aircraft in crashes on 30 and 31 August. Also aircraft number 356 developed a very bad stall characteristic soon after acceptance. Approximately one month was lost while extensive flight and ground testing was made. The final fix on this problem was to change both wings.

4. Six pilots had completed the training program before the USCM started. One pilot accomplished his last training mission during the USCM. The remaining two pilots each require three long-range missions and will complete training prior to 15 November.

5. Approximately seventy hours of formal ground school was completed by all pilots.

6. Average flying training statistics on the seven pilots participating in the USCM are:

a. Flying hours scheduled in the T-33	5:30
b. Flying hours flown in the T-33	5:30
c. Flying hours scheduled in the U-2	53:00
d. Hours flown in the U-2	54:00
e. Missions scheduled	15
f. Missions flown	16 2/3

7. The Detachment Commander and one flight commander have been checked out in the U-2. The Operations Officer and the other flight commander are in T-33 transition and will be checked out in the U-2 when proficiency permits.

TOP SECRET

8. Although delayed arrival of staff officers and shortage of aircraft slowed the training down somewhat, training was completed in only two and one-half months. Much credit should be given to [ ] and his staff for getting organized and operating as a highly efficient unit in a very short period of time.

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9. Although high altitude flame-outs occurred frequently, professional handling of the situation by the pilots resulted in few aborts. Since all training flights in the U-2 are with the -37 engine, the relatively high flame-out rate is not considered significant.

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ANNEX I

TAB "A"

Narrative of Formal Training

**SECTION II - Maintenance and Supply**

**1. Maintenance:**

a. The establishment of Detachment "C" maintenance organization and procedure was seriously hampered during the early portion of the training program due to shortages of key supervisory personnel, shortage of aircraft and failure of Project Headquarters to furnish maintenance directives. The shortage of aircraft was caused by a ground loop on number 355, 30 August, and crash of number 354 on take-off, 31 August.

b. Much improvement was noted during the latter part of September and through October up to the start of the USCM. This improvement was brought about with the arrival of key personnel who, due to their high level of experience, quickly organized the Detachment "C" maintenance organization and implemented proper maintenance procedures. Inasmuch as Project Headquarters never furnished the maintenance directives, they were published by the Director of Material. Project Headquarters Directive 66-2 was revised and published as a Detachment "C" SOP pending receipt of the revision from Project Headquarters. Due to lack of implementation of this directive, abort and malfunction data and information has been sparse. Detachment "C" has recently appointed an officer as operations analyst. This officer is beginning to accumulate some information on the reliability of auxiliary equipment which will be very useful to the detachment commander.

c. Forms maintenance has been good, maintenance of aircraft status has been unsatisfactory, but is being corrected. There are only sixteen (16) modifications outstanding on two aircraft, 356 and 357, which are permanently assigned to the detachment. Ground powered equipment has remained in commission approximately 100% of the time.

d. There have been few airframe malfunctions, the two most important of which was a forward landing gear bulkhead failure, due to an error in the Bakersfield assembly line on their first aircraft, and the left wing drop and yawing condition on 356. This condition was corrected by changing the wings.

e. There are three major problems on the J-57-37 engine which have occurred during the formal training phase. These are, the old problem of flame-outs, excessive oil consumption and oil leakage. These problems are discussed as follows:

- (1) **Flame-outs.** A total of 25 flame-outs have been experienced. Causes for the flame-outs are difficult to determine but are known to result from pilot technique as well as from

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engine and/or accessory malfunctions. Many adjustments have been made to fuel controls, and in one case it was necessary to change the engine and return to overhaul. To date no positive solution has been found to eliminate flame-outs on -37 engines. The dash 31 engine should eliminate most flame-outs, if experience follows that of the other detachments.

- (2) Excessive oil consumption. This condition is caused by oil loss through the number 3 bearing seal. A fix, consisting of application of pressure on the number 3 bearing seal has previously remedied this condition. It appears that PMW has no program to call back engines already in the pipeline to apply the fix. Consequently, engines furnished to the program without the fix experienced excessive oil consumption.
- (3) Oil leakage. This is a new problem on the dash 37 engine. After approximately five minutes of engine run on a new engine installation, oil starts running out of the front accessory case water plug drain. Preliminary checking by [ ] PMW representative, in conjunction with PAC, has failed to reveal the source of the oil leak. At present, this appears to be a problem that can be solved only at overhaul.

f. Analysis of information gathered by the Detachment "C" Operations Analysis Officer, indicates that drift sights, hand controls, tracking cameras and "A" configurations have been approximately 50% effective. Three runs on the "B" configuration have been zero percent effective. Tests to date on the L-V configuration have been 50% effective.

g. The Detachment "C" maintenance organization is rated effective overall for the formal training phase.

## 2. Supply:

a. The equipment and spares for Detachment "C" as authorized on the Special List of Equipment (SLOE) and the Flyaway Kit Listing (FAK) were to the extent available, assembled and binned at the Project Depot Warehouse, [ ] California during the period 16 July to 19 August 1956. Five (5) supply personnel of the [ ] Support Wing and [ ] (NCOE Detachment "C" FAK Section) assisted the Project Depot in accomplishing this function.

b. The equipment and spares that were assembled and binned at [ ] Depot were airlifted [ ] during the week of 19 August 1956. Action was taken by the [ ] Support Wing representatives to establish the supply operation in accordance with the Project Headquarters 67 series directives. During the initial phase of training only two (2) supply personnel of Detachment "C" were available. They were the

NGOIC of the Flyaway Kit Section [ ] and the NGOIC of the SLOC Section [ ] On the 1st training was started immediately upon receipt of supplies [ ] for the two (2) NGOIC's. As other personnel of the supply section arrived they were incorporated into the training program. They were trained in the proper receipt, storage, issue, requisitioning and accountability of supplies in accordance with the 67 series of Project Headquarters Directives.

c. The following reflects the supply section authorized manning as of 22 October 1956 and dates personnel were assigned when applicable:

Title	Grade	Authorized	Date Assigned	Name
Supply Officer	Captain	1	15 Oct 56	
Supply Supervisor	H/Sgt	1	13 Aug 56	
Supply Specialist	A/LC	1	24 Sep 56	
Warehouse Supervisor	H/Sgt	1	21 Aug 56	
Warehouse Specialist	S/Sgt	1	8 Sep 56	
Warehouse Specialist	S/Sgt	1	23 Oct 56	
Warehouse Specialist	S/Sgt	1	None	
Clerk Typist	A/LC	1	30 Aug 56	

d. As can be noted above there is one (1) Warehouse Specialist short. Current Operation of the supply section does not require three (3) Warehouse Specialists. The supply section could use, very advantageously, a Supply Records Specialist in the place of the Warehouse Specialist. Two (2) Stock Record Specialist are required in order to properly maintain supply records as there are two (2) separate sets of stock record cards, one (1) in the SLOC Section and one (1) in the FAK Section. The supply personnel shortage in this field should be rectified prior to deployment based on the experience of the units currently overseas which indicated a considerable heavier supply work load at the overseas site. Director of Material for Detachment "C" is initiating change request to T.O. deleting one Warehouse Specialist and requesting one Stock Record Specialist.

e. The equipment and spare support provided by the Special List of Equipment (SLOC) and the Flyaway Kit Listing (FAK) authorization during the training phase was considered satisfactory. Existing shortages are being constantly monitored by the [ ] Support Wing. Special follow-up is being conducted on all critical shortages. The shortages of oxygen servicing equipment was one of the most critical deficiencies. Oxygen trailers could not be used to service aircraft without modification. At present date one trailer oxygen has been modified and the other is at the contractors for modification. Other marginal areas include the special personnel equipment support and initial shortages of certain contractor items as noted by low percentage on attached percentage charts. Project Headquarters has been advised of all shortages in personal equipment. Project Headquarters has assumed responsibility for supply of shortages that exist in FAK and SLOC Section of Detachment "C".

f. The attached charts reflect the status of equipment and spares on hand against authorizations as of 22 October 1956.

**SECRET** (When filled in)

ALL SECTIONS

DETACHMENT "C"

## SECTION

UNIT

**PERIOD**

LOCKHEED

PRATT &amp; WHITNEY

RAMO-WOOLRIDGE

**HYCON**

**AIRBORNE COMMO**

**SPECIAL PERSONAL  
EQUIPMENT**

## COMMON HARDWARE

**GROUND POWERED  
EQUIPMENT**

**OVERALL PERCENTAGE**

[illegible]

**SECRET** (When filled in)



**SECRET** (When filled in)

## DETACHMENT "C"

UNIT

**PERIOD**

OVERALL PERCENTAGE

**SECRET** (When filled in)

**SECRET** (When filled in)

## ALL SECTIONS

DETACHMENT "C"

## SECTION

UNIT

LOCKHEED

RAMO-WOOLRIDGE

HYCON

**GFAE**

**SPECIAL PERSONAL EQUIPMENT**

OVERALL PERCENTAGE

[illegible]

**SECRET** (When filled in)

**ALL SECTIONS**  
**SECTION**

DETACHMENT "C"  
UNIT

LOCKHEED  
RAMO-WOOLRIDGE  
HYCON  
GFAE  
SPECIAL PERSONAL  
EQUIPMENT  
OVERALL PERCENTAGE

[illegible]

ANNEX I

NARRATIVE REPORT OF TRAINING

TAB "A" - Formal Training

SEC I - Operations and Training

SEC II - Maintenance and Supply

TAB "B" - USCM

SEC I - Operations and Training

SEC II - Maintenance and Supply

ANNEX I

TAB B

Narrative of Unit Simulated Combat Mission

SECTION I - Operations and Training

1. Formal training for this unit was completed on 19 October 1956. The Unit Simulated Combat Mission to determine the overall effectiveness of the organization was scheduled to commence on 24 October. Evaluation of the results was in accordance with [ ] Support Wing Technical Pamphlet 170-1, dated 10 July 1956 (Annex II).

25X1

2. Project Headquarters planned and directed all missions in accordance with their standard operating doctrine for combat missions. Mission results were analyzed [ ] by detachment and [ ] wing personnel.

25X1

3. Eight missions were directed by Project Headquarters. One of these was cancelled due to a shortage of aircraft. The detachment normally would have had four aircraft available during the UAC. However, due to engine problems which have been experienced recently and also due to one aircraft being damaged when an equipment hatch was lost in flight, only three aircraft could be used. Of the seven sorties launched, six completed the mission as briefed. One experienced a flame-out over simulated enemy territory. Two flame-outs occurred during let-down over home base. The same aircraft was involved in all three flame-outs.

4. Mission preparations, briefings, etc. were conducted in an outstanding manner by the unit.

5. Fifty-eight photographic targets were designated by Project Headquarters. Of these, 13 could not be covered because of weather and 4 were lost due to a flame-out in the target area. Deviation from assigned flight line on 38 of the remaining 41 targets was less than five miles.

6. Sixty celestial observations were made with an average C.E. of 11.9 NM. [ ] on mission 1036, accomplished 11 shots with a C.E.A. of 5.9 NM.

25X1

7. A brief narrative of each day's operations follows:

a. On 24 October, two sorties were scheduled and launched. One was 1 minute and 59 seconds late on take-off due to an auto-pilot malfunction which developed in the pilot's pre-take-off check. Both missions were flown as briefed.

b. On 25 October, three missions were launched. One take-off was delayed 5 minutes and 20 seconds by a popped generator circuit breaker located in the equipment bay. This required removal of the hatch after

engine start. Two missions were completed as briefed. One pilot experienced a flame-out in the target area. He cut out 4 targets after he had made his re-start and completed the remainder of the mission.

c. On 26 October, two sorties were launched. One take-off was delayed 7 minutes and 50 seconds by a face-plate heating system failure shortly before take-off. Both missions were flown as briefed with excellent results.

8. Statistics of each mission as it was flown and scored are contained in Annexes III, IV and V. The overall operational results of the USCM are considered excellent with the exception of the relatively high reconnaissance equipment failure rate shown in Tab C of Annex III. Much of this can be attributed to the fact that most cameras are newly delivered from the factory and have not had an extensive operational shake-down.

ANNEX I

TAB "B"

Narrative of Unit Simulated Combat Mission

SECTION II - Maintenance and Supply.

1. Maintenance:

a. Maintenance organization: The overall rating of the maintenance organization is effective. Pertinent areas which are considered worthy of mention are as follows:

(1) Deficient areas:

- (a) It was recommended that pilots be required to enter all malfunctions encountered during flight in the DD 781-2 form. These write-ups should include remarks on the airframe, engine and auxiliary equipment (cameras, camera lights, driftsights, sextants, etc.).
- (b) It was recommended that emphasis be placed on maintaining aircraft and auxiliary equipment status on a current basis. This is a primary responsibility of the maintenance supervisor assisted by the branch chiefs and should be closely monitored by the Director of Materiel.

(2) Noteworthy areas:

- (a) Turn around of aircraft. Due to loss of aircraft number 354 and 355 early in the program and flight test difficulties on aircraft number 358 (due to engine oil leakage, etc.), only three (3) aircraft, numbers 344, 356 and 361 were available to Detachment "C" during the USCM. An outstanding job was done by all maintenance personnel in turning these aircraft around each day for the succeeding day's flight, with a minimum of difficulty.
  - (b) Maintenance of ground support equipment. Maintenance of this equipment is considered outstanding.
  - (c) Cooperative attitude. The sincere attitude of all personnel of the aircraft maintenance organization and the high degree of cooperation between all maintenance branches and personnel is commendable.
- (3) Action was taken by the Director of Materiel during the USCM to correct the deficiencies noted above.

b. Planning and coordination between operations and maintenance functions is rated effective overall. Teamwork between these two functions is commendable.

c. Reliability of aircraft and equipment:

(1) Airframe. Only two (2) discrepancies were encountered on the airframe during the USCM. On aircraft number 361 the main gear indicator showed an unsafe condition with the gear retracted. This was caused by an improper fit at the drift sight bubble faring, which was adjusted. The second discrepancy occurred on aircraft number 356 when the generator field circuit breaker popped just prior to take-off. This was corrected by pushing in the circuit breaker. This circuit breaker is located in the camera bay in such a position that it was extremely difficult to reach with cameras installed, and this caused a late take-off.

(2) Engines:

(a) Only four (4) engine malfunctions occurred during the USCM, all of which were on aircraft number 344. On 24 October a flame-out occurred at base plus 14, was re-started and flamed out again on let down. No discrepancies which could be corrected were found upon return. On 25 October another flame out occurred at base plus 14 and again on let down. The surge bleed valve governor was replaced and pressure sensing line tightened, but did not correct the condition. This engine has a history of flame-outs, has approximately 100 hours accrued, and is being returned to overhaul.

(b) Oil consumption varied from 3 to 17 quarts, or an average of 9.7 quarts per sortie. Capacity of the oil tanks is 56 quarts.

(c) One engine was built-up at the beginning of the USCM, and by the end of the USCM, a second built-up engine was nearing completion.

(3) Auto-pilot. Five malfunctions occurred on auto-pilots. Two on aircraft number 344 and three on aircraft number 361. These discrepancies were all in the aach sensor, except one on aircraft number 344, requiring replacement of amplifiers and adjustments. The other discrepancies on aircraft number 344, was a short circuit in the aileron trim tab indicator which made



it impossible to disconnect the auto-pilot just prior to take off. The trim tab indicator was disconnected and take off made over a minute late.

- (4) Sextants and drift sights. There was one sextant discrepancy and one drift sight discrepancy. On the sextant, the averager was inoperative and was removed and replaced. The drift sight problem was caused by a bent hand control which was removed and replaced.
- (5) Communications. Communications equipment gave a minimum of difficulty. One ARC-34 went out after the aircraft was prepared, but was changed and did not affect the take-off. Two radio compasses were 4 to 6 degrees off track and required re-swinging.
- (6) Cameras.
  - (a) A-2 configuration malfunctions. There were three (3) magazine malfunctions, one requiring a magazine to be returned to the factory, one with film tracking improperly which was corrected by spring tension adjustments, and a film tear believed to be by an interruption of power during a flame-out. There were three (3) other malfunctions, one a "B" light blinking -- requiring adjustment of a microswitch, a "C" light out, again believed to be caused by a flame-out, and a "B" shutter and oblique drive motor failure, requiring return to the factory for repair.
  - (b) Tracker malfunctions. There were two (2) tracker malfunctions, one, a tracker stopped cycling which was corrected by replacing a relay rack and the second caused by a defective optical system, which required replacement.
  - (c) "B" Configuration malfunction. Of the two (2) "B" configurations installed, neither was successful. On the first one, the Minivib (vibration detector) was left off intentionally. In doing so, certain circuiting problems were created but not realized, and the configuration malfunctioned. Additional experience and probable design improvements appear to be required on this configuration. The second malfunction was caused by a jammed case drive in the oblique magazine. This magazine is being returned to the factory for repair.

- (7) The overall aircraft in-commission rate during the USCM averaged 74.5%.
- (8) Ground support equipment. All essential equipment except one oxygen cart was in place. One oxygen cart was borrowed from the LAC test unit during the USCM. While all oxygen carts had been previously furnished, it was necessary to return one  for modification by LAC. The ground support equipment personnel did an outstanding job of maintenance of their equipment during the test. The average in-commission rate of ground powered equipment during the USCM was 99.6%.

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d. Assignment and Training of Maintenance Personnel:

- (1) Lockheed. All authorized LAC personnel are assigned and in place. Experience level of LAC personnel remains high for Detachment "C", the same as for previous detachments, averaging approximately 15 years of extensive aircraft maintenance experience. Personnel assigned are versatile and qualified as a unit in all specialties required by the U-2 aircraft.
- (2) Hycon. All authorized LAC personnel are in place. The experience level of these people is high but varied. The average experience in industry averages over ten years. Only two men have degrees in engineering, but emphasis has been placed on providing more key people with previous airborne camera maintenance experience. As a result, installation and removal of cameras, and overall coordination with other branches in the maintenance organization has posed no problems.
- (3) Communications. The average experience level of the communications personnel varies from three to ten years, the average experience level being approximately seven years.

2. Supply:

a. During the USCM a normal supply operation continued: Supplies were received, binned and accountability established. Issues were made and reparable were received, processed and shipped to depot. Administrative procedures were carried out in an effective manner. All personnel assigned to Detachment "C" supply were present for duty and participated in work load during the USCM. The shortage of one (1) Stock Records Specialist, AFSC 64152, was compensated for by other personnel of the Supply Section assuming additional workload. The authorized manning is considered the minimum requirement, and if supply personnel shortages still exist on arrival at overseas site, a satisfactory supply operation for an extended period of time in accordance with Project Directive 67 series cannot be expected.

b. During the USCM, the Flyaway Kit was considered effective on the following support statistics:

	<u>Total Items</u>	<u>Line Items</u>
Requested	272	55
Issued	272	55
Percentage	100%	100%

c. The Flyaway Kit activity immediately prior to the USCM is considered significant. During a three day work period; 19, 22, and 23 October, considerable maintenance work was accomplished and is reflected by the following Flyaway Kit statistics for this period.

	<u>Total Items</u>	<u>Line Items</u>
Requested	180	46
Issued	179	45
Percentage	99.4%	97.8%

d. The Unit Mission Equipment effectively supported the operation except for one (1) trailer, oxygen, that is at the contractors at the present time for modification. During the training phase and the USCM one (1) oxygen trailer at the test site was utilized to augment resources of Detachment "C" to service aircraft. Other equipment shortages of lesser importance are being closely monitored to insure all items possible are provided prior to deployment.